



New Data Sources and Signals on Presidential Approval

Daily Indicator Based on Google Trends

Bastián González-Bustamante

University of Oxford

✉ bastian.gonzalezbustamante@politics.ox.ac.uk

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Introduction

Introduction

Google search volumes (GSV) could be a powerful source of alternative signals and data. However, GSV data show limitations because Google provides an index of the volumes rather than the actual searches for privacy reasons ([Eichenauer et al., 2020](#)):

- Unreliable time series;
- Queries based on a random subsample of searches;
- Frequency-inconsistency.

This work presents and cross-validates a **novel indicator of approval based on GSV**.

GSV Indicators

GSV Indicators

We use a novel sampling approach, based on [Eichenauer et al. \(2020\)](#), to generate more stable daily GSV indicators aligned and corrected with weekly and monthly series to elaborate daily approval indicators for **12 presidential democracies from the mid-2000s to date**, considering seasonal adjustment for time series.



Long-Run Daily Series Algorithm

1. **Sampling procedure.** We drew 12 samples for each **keyword** associated with **stochastic events** concept.

For example, the event-based approach of government survival literature assumes the existence of stochastic events that may affect the political system (see Browne et al., 1986; Fortunato and Loftis, 2018; Warwick, 1995).

Monthly series are also drawn 12 times. All of this is for each country.

🔍 Keywords

Failures; Crises; Scandals; Corruption

Long-Run Daily Series Algorithm

2. **Harmonisation of daily, weekly and monthly series.** Our assumptions are that monthly data captures long-term trends, weekly searches medium-term and daily data short-term. We bent the daily series to weekly ones ([Chow and Ioh Lin, 1971](#); Eichenauer et al., 2020; [Sax and Steiner, 2013](#)). Then, we applied a similar procedure for monthly data. This allowed us to combine the different frequencies for a specific keyword.
3. **Seasonal adjustment.** We used the Prophet procedure ([Taylor and Letham, 2018](#)) to detect yearly and weekly seasonal effects, considering cyclical patterns associated with the seasons.

For example

Just as winter increases energy expenditure, in political terms, we assume that certain seasons can change people's behaviour. Perhaps at Christmas, people are less critical.

Long-Run Daily Series Algorithm

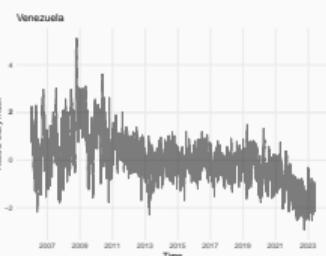
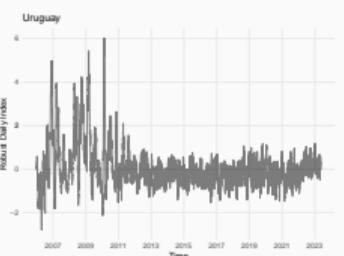
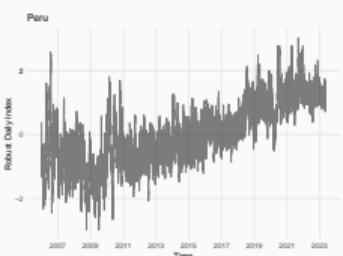
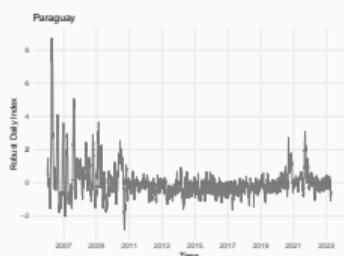
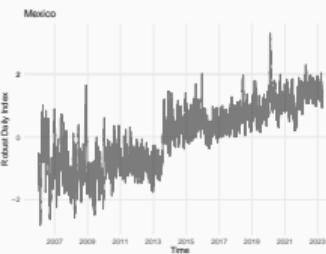
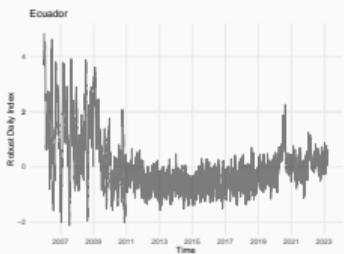
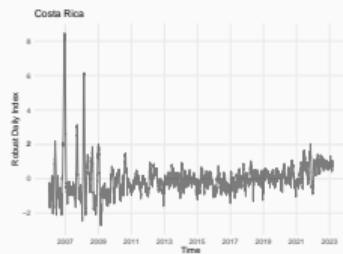
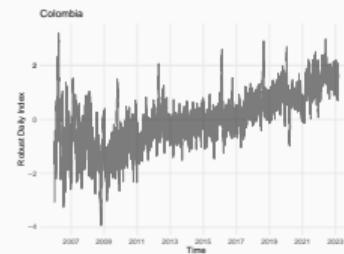
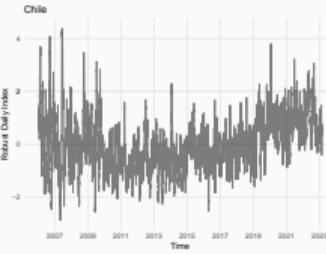
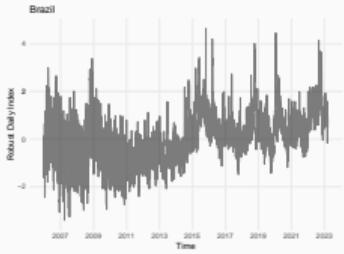
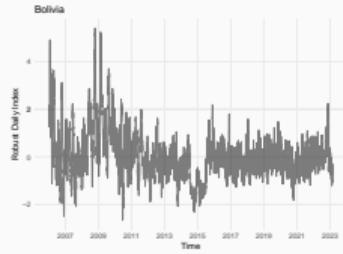
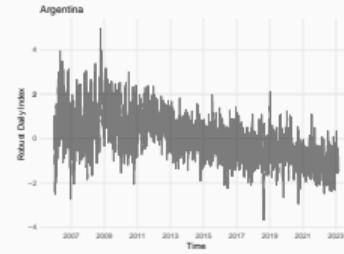
4. **Index aggregation.** Finally, we aggregated the series by performing a PCA and extracting the first component (higher shared variance) of our keywords, and we normalised the series:

How to read the index ⓘ

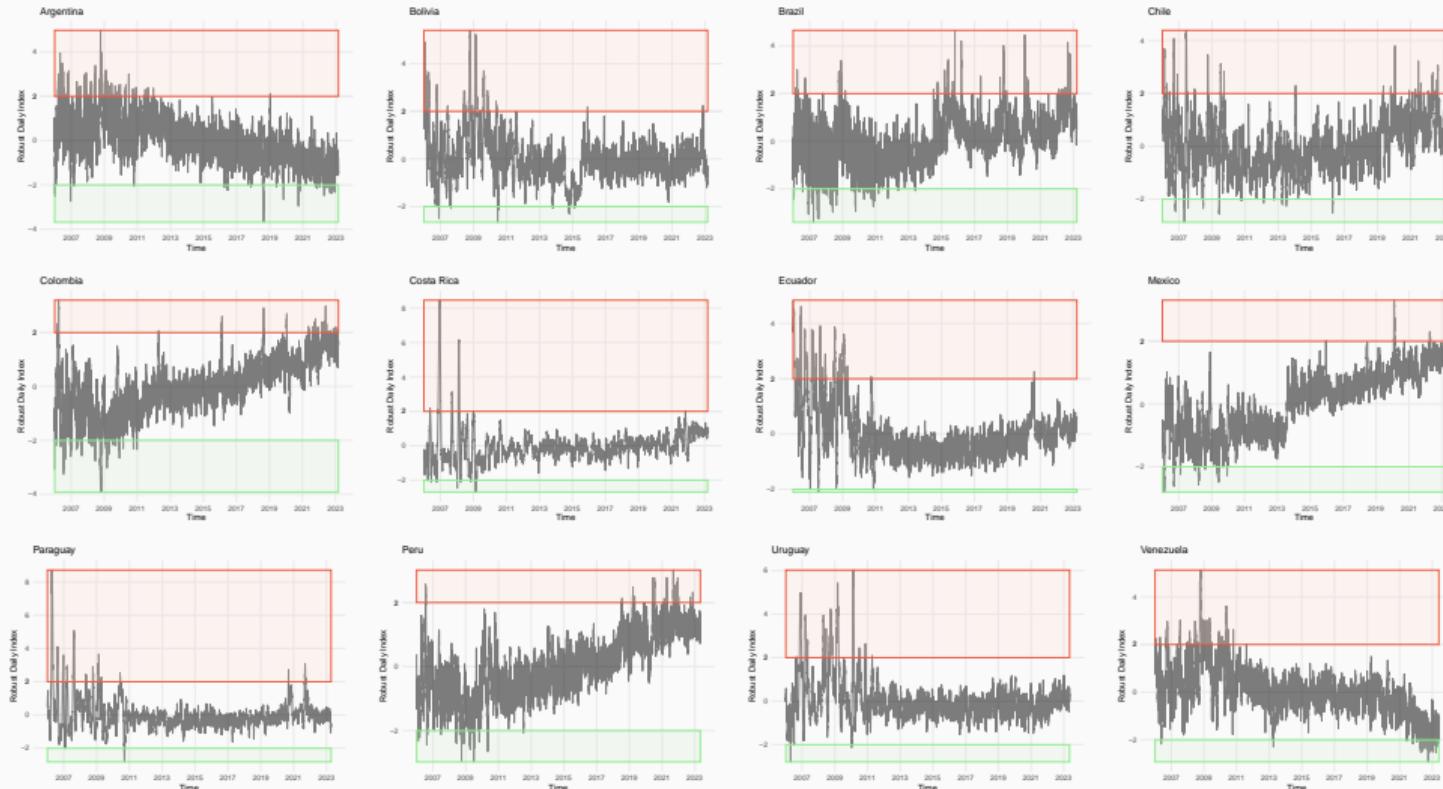
The **long-term average is zero**, and values such as 1 or 2 mean that the search volume varies from those standard deviations of the long-term average. Considering our keywords, positive values should be associated with lower approval.

Note. We do not have country holidays for      . In these cases, seasonal adjustment was performed without using holidays.

Robust Daily Index



Robust Daily Index



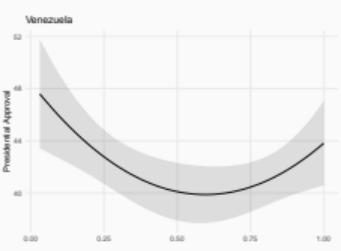
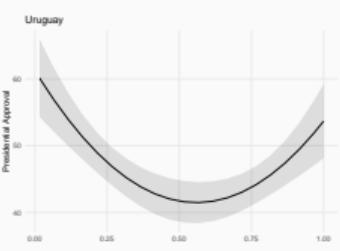
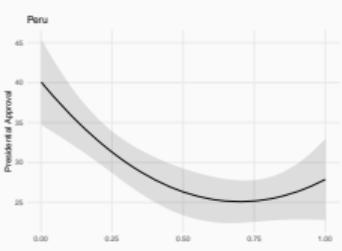
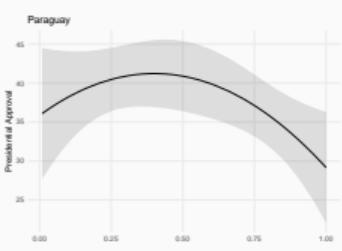
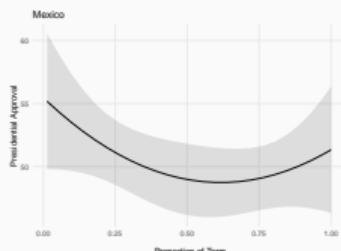
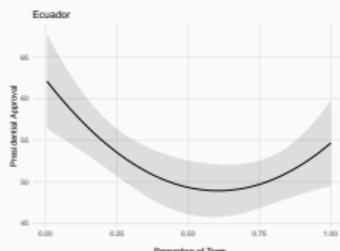
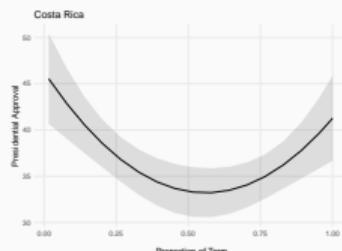
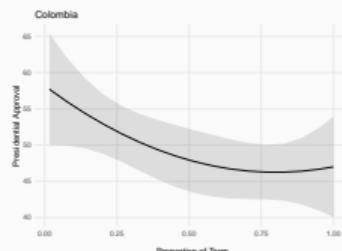
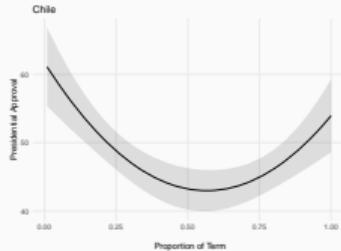
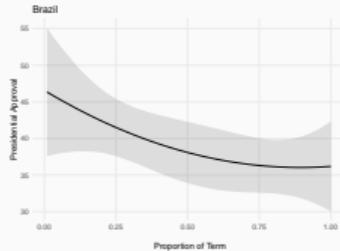
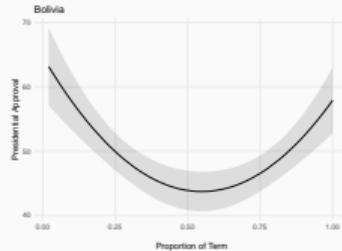
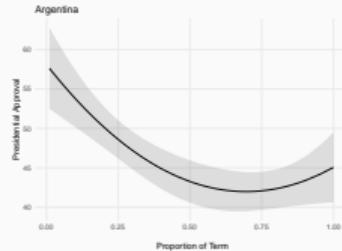
Assessing Dataset Validity

Observational Panel Models

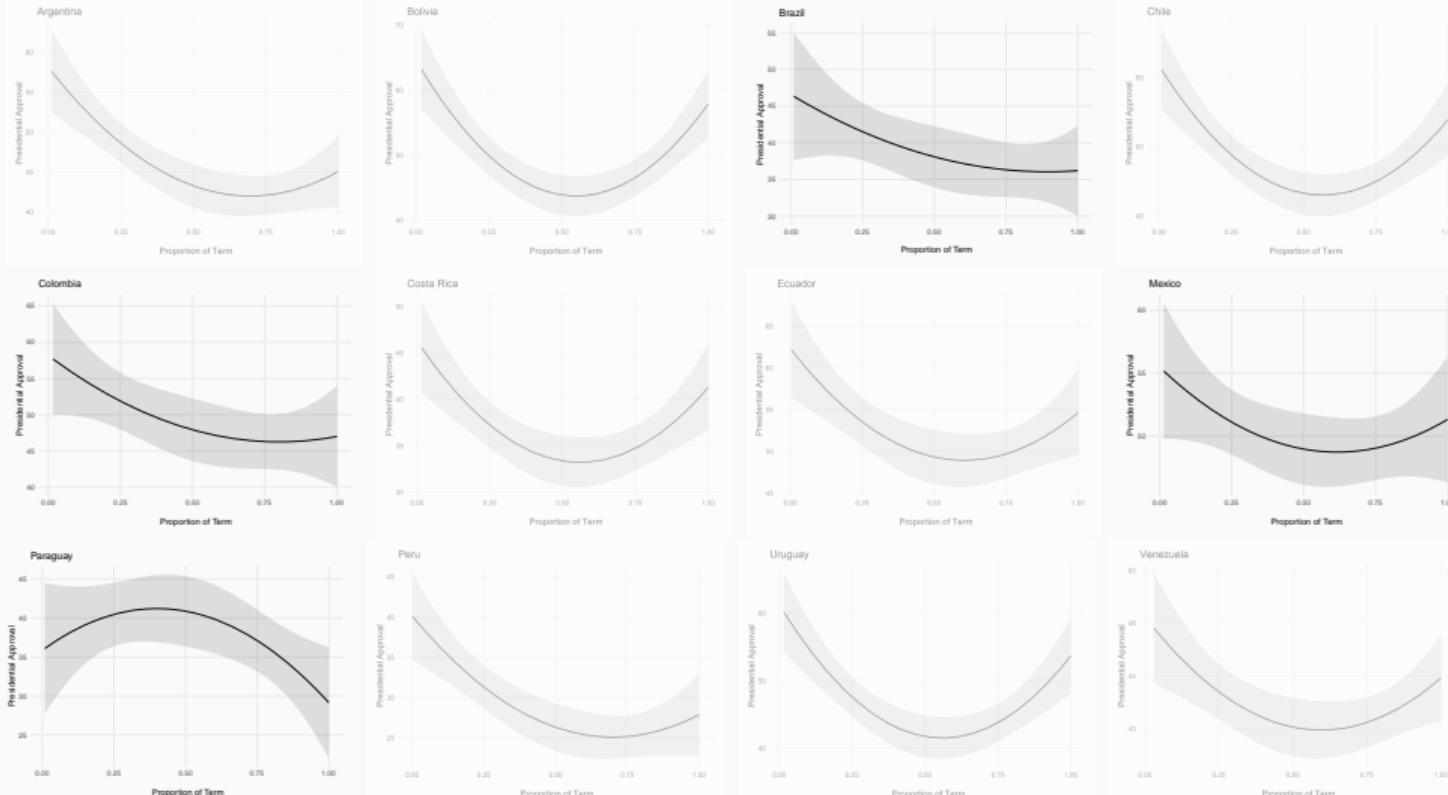
We incorporated **time-varying indicators** such as the smoothed quarterly presidential approval of Carlin et al. (2019) and indicators from the World Bank (2022). Then, we fitted OLSs to test the **quadratic dynamics of presidential approval** (Brace and Hinckley, 1992; Carlin et al., 2018; Stimson, 1976) using approval data, macroeconomic indicators, dummy variables for quarters (honeymoon and slight recovery towards the end of the term) and our GSV indicator. The following is the fully specified model:

$$Y_i = \alpha_i + \zeta GSV_i + \beta GDP_i + \gamma inflation_i + \sum_{j=1}^J \delta_j quadratic_{j[i]} + \eta quarter_i + \xi country_i + \varepsilon; \quad (1)$$

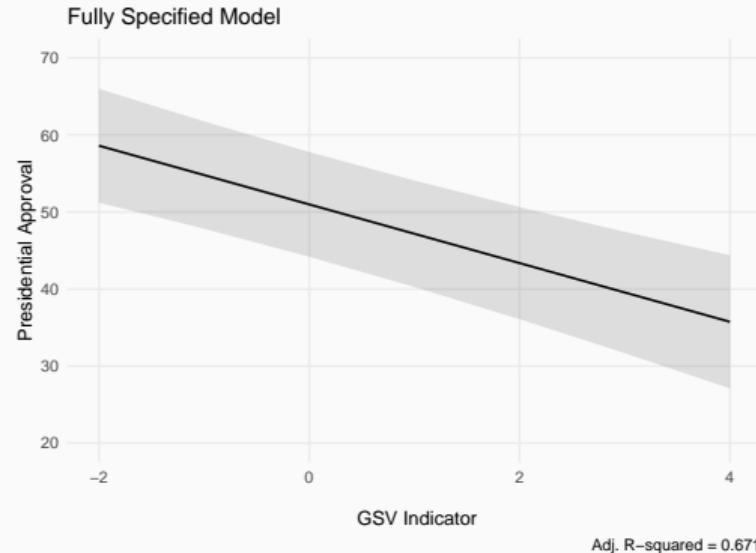
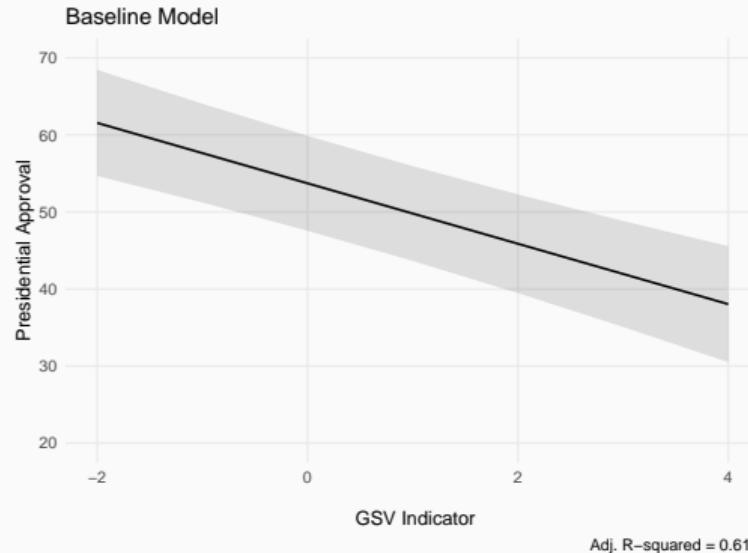
Dynamics of Presidential Approval



Dynamics of Presidential Approval



Marginal Effect of GSV Indicators on Approval



Cross-Validation with Archives

Detail of the Batches of LAWR Archives

Batch	Archives	Years	Format	Volume
Batch-01	LAWR-1975 to LAWR-1979 Including 1997	5	 CSV UTF-8	9.56 MB
Batch-02	LAWR-1980 to LAWR-1998 Excluding 1997 Including the first half of 2003	18.5	 PNG images	38.5 GB
Batch-03	LAWR-1999 to LAWR-2021 Excluding the first half of 2003	22.5	 PDF files	341 MB

Binarisation Techniques for Enhancing OCR

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Note. The images correspond to a LAWR page before binarisation and after the application of the techniques of Sauvola and Pietikäinen (2000), Singh et al. (2011) and Su et al. (2010).

Tesseract's Layout Analysis Module



Argentina are still hotly debating what lay behind the sudden resignations of President Raúl Alfonsín and his replacement by Domingo Cavallo and the rapid, uncontrolled uprising of the dollar rate – dismissed as suffi- cient reason, and much has been published about all sorts of politi- cal, financial and economic factors. One that seems firmly established is that Cavallo had been plotting to oust Menem, and, according to sources with access to the president, would one day accept it. However, a widely accepted version is that Menem, who had been instrumental in appointing Cavallo as his economy-minister, to preside over the period of transition, had been informed that he would follow a first phase of "state sailor". In this scenario, all Cavallo had to do was to choose his own timing.

Another strand of interpretation is that the change took place as a result of events he had not bargained with. It is claimed that Cavallo was unable to organise the share-out of key ministerial posts and even to appoint men of his own persuasion towards his decision to pardon the military leaders of the "dirty war" of the 1970s. The scenario is that he was instrumental in the highest reaches of the government, and the result was that he decided to go. In this, he could not count on the Bush administration's support from the start.

This, at a time when even such highly placed members of his government, Vice-President Eduardo Duhalde and the head of the Jefatura, in the manoeuvring to engineer Menem's departure from the community of the government, had been miffed about which of the many constitutional succession procedures would find most favour.

INSIDE

- PERU: Wildlife spread of cholera epidemic. (8)
- EQUADOR: "Holiday" disease impact on oil. (2)
- COSTA RICA: President of the Republic presents title, along with CHLUS. (2)
- VENEZUELA: Lower prices for state budget deficit. (8) ■
- BOLIVIA: A Soviet partner for Potosí's miners? (2)
- CHL: Proposal to extend Ayllón's mandate. (6)
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How Domingo Cavallo rose to become Menem's virtual prime minister

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Many expect Cavallo to push for an agreement with the main opposition party, Radial Agraria's Union Popular (UP), in the Asamblea Constituyente (ACN). This would be a new form of coalition that would ensure the continuity of the government. The scenario is that the community of the government, and even US diplomats, have been miffed about which of the many constitutional succession procedures would find most favour.

It was at this point, the scenario goes, that Cavallo bolted from the community of the government. As a result, Cavallo has emerged not only as the new economy minister, but also as the man most responsible for organising the share-out of key ministerial posts and even to appoint men of his own persuasion towards his decision to pardon the military leaders of the "dirty war" of the 1970s. The scenario is that he was instrumental in the highest reaches of the government, and the result was that he decided to go. In this, he could not count on the Bush administration's support from the start.

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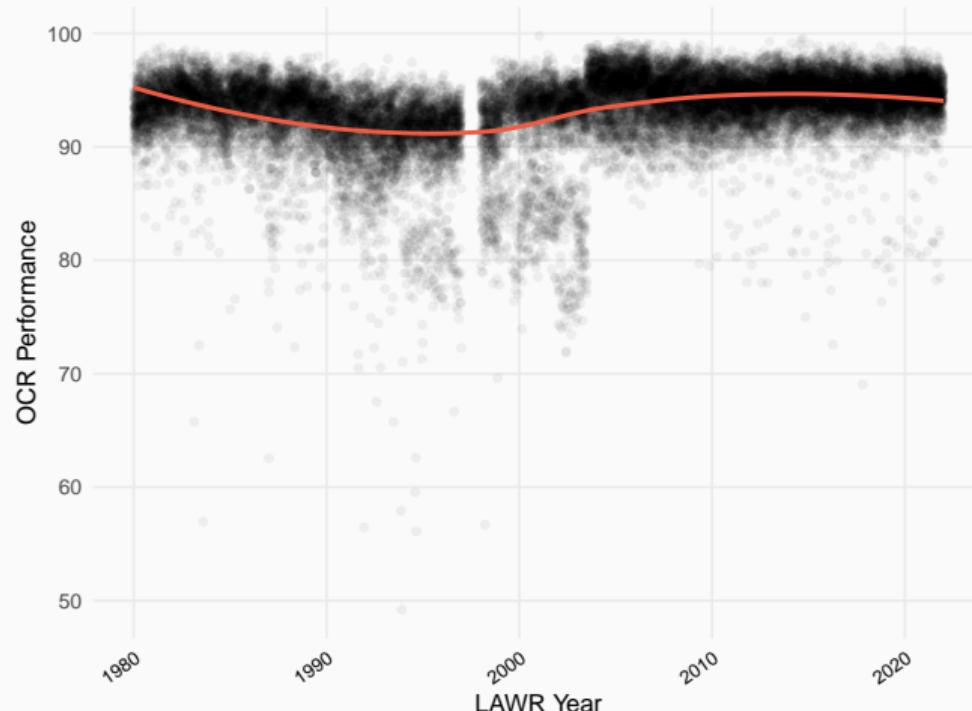
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Tab-Stop Lines — Column Layout — Segmented Blocks

Performance and Accuracy of the Tesseract OCR Algorithm



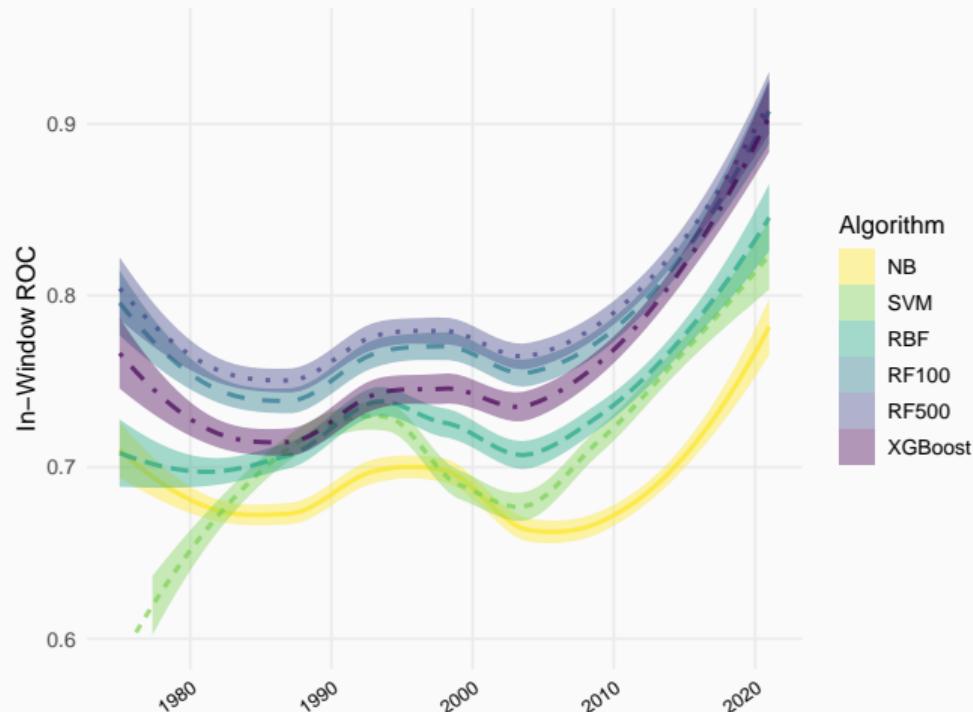
Accuracy is based on the proportion of text that was correctly identified.

This calculation was performed after extracting stop words and carried out with dictionaries trained with **Long Short-Term Memory (LSTM) models** used by Tesseract.

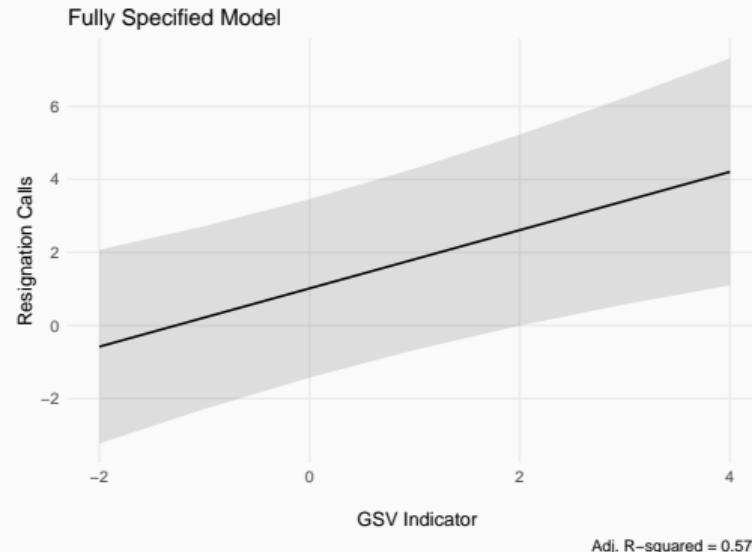
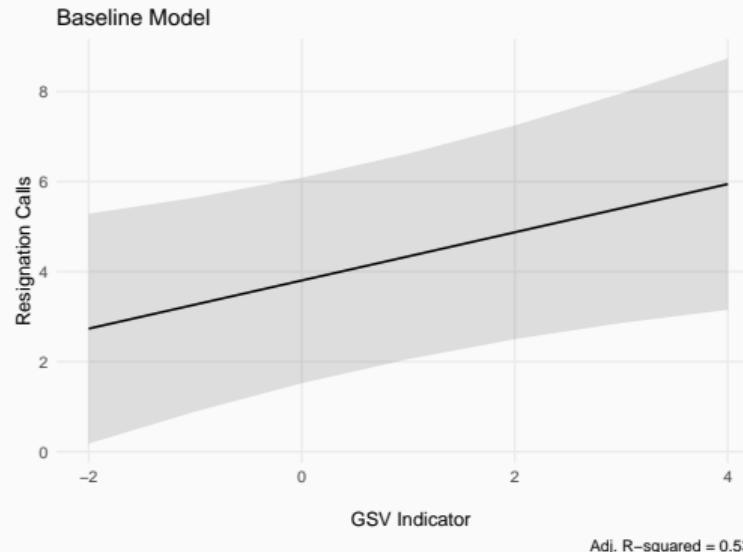
ROC Semi-Supervised Models to Classify Ministerial Resignation Calls

Following a strategy similar to [Greene et al. \(2019\)](#), we used a **five-year fixed rolling window**.

ROC indicators were 10-fold cross-validated in the five-year rolling window testing set between 1975 and 2021.



Marginal Effect of GSV Indicators on Resignation Calls



Note. We replaced Y for the RCs indicator in the LHS.

Interaction between GSV and Resignation Calls Indicators

Two-Way Interaction Model



We incorporated the interaction between GSV and RCs in the RHS.

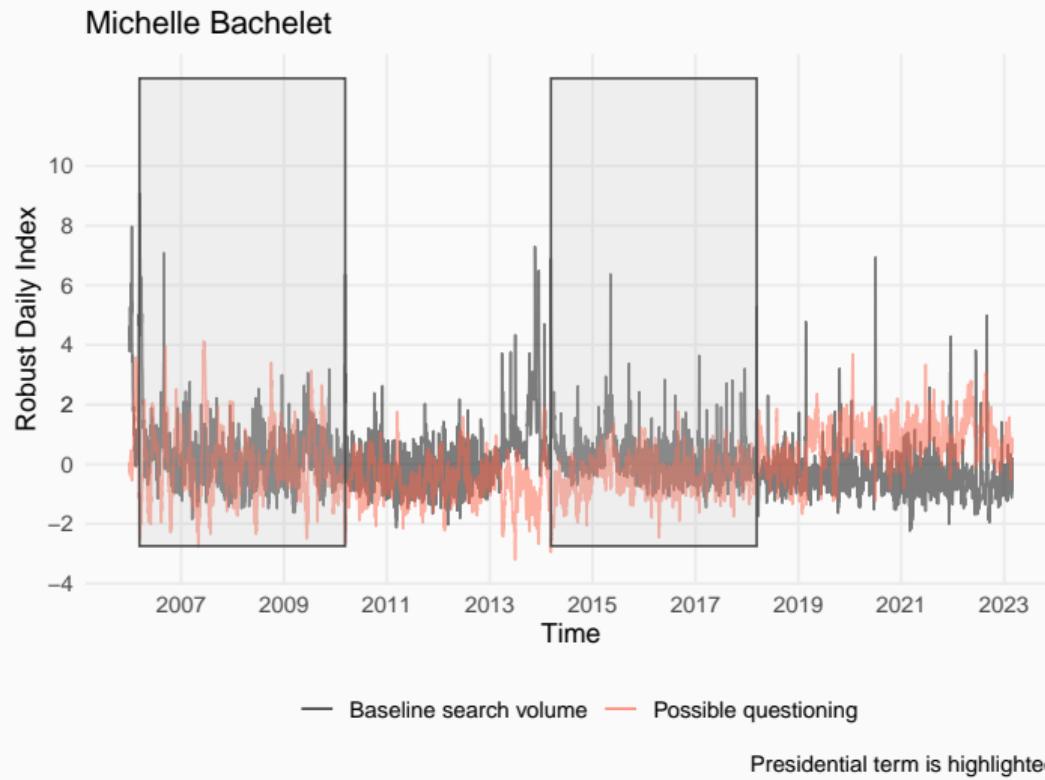
Low search volumes for negative words combined with resignation calls can increase approval. It could be a sign of **political activism and good performance** rather than questioning.

Take Aways

Take Aways

- ☒ GSV indicators show a **negative relationship with approval**, even controlling for macroeconomic indicators and dummies for quadratic patterns of a presidential term.
- ☒ On the contrary, we found a **positive relationship with the resignation calls indicator**, elaborated by combining data mining and machine learning techniques.
- ☒ The two-way interaction model suggests **GSV could be too noisy at this stage**. Maybe additional keywords or **fine-tuned measurements** are necessary.

Fine-Tuned GSV Example



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Thank you very much!



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